

CLAIMS

What is claimed is:

1. An internal safety structure for toasters comprising a circuit board, a motor, a lifting rack and other components, which is characterized in that the motor is a low voltage direct current motor which drives the lifting rack to move upwards or downwards through a set of gears, a set of clutch gears and a driving gear bar; on the circuit board, an upper sensor and a lower sensor are installed to sense the lifting level of the lifting rack; on the circuit board, there is an integrated circuit which contains custom software to preset the operation and control programs; on the circuit board, a transformer is installed to reduce the voltage of the alternating current, which supplies power to the circuit board and the motor through a set of diode rectifiers changing the alternating current to direct current.
2. An internal safety structure for toasters as in claim 1, wherein the set of gears comprises an endless screw which connects and rotates with the motor, and two or more straight-tooth gears which are intermeshed with one another and mesh and rotate with the motor; and one side of the straight-tooth gears meshes with the set of clutch gears.
3. An internal safety structure for toasters as in claim 1 or 2, wherein the set of clutch gears comprises a transmission shaft and a clutch straight-tooth gear, a clutch spring and two or more intermeshed clutch gears which are installed on the transmission shaft; one side of the clutch gears meshes with the straight-tooth gear; one side of the clutch straight-tooth gear meshes with the driving gear bar; when the motor rotates, the set of gears drives one clutch gear in the set of clutch gears to rotate; the rotating clutch gear is pushed by the tension which is created by the clutch spring towards the second clutch gear and drives it to rotate; the second clutch gear drives

the clutch straight-tooth gear to rotate through the transmission shaft; the clutch straight-tooth gear drives the driving gear bar to move upwards or downwards; when the lifting rack is out of order and becomes immovable, the driving gear bar cannot move upwards or downwards and so the clutch straight-tooth gear and the second clutch gear cannot rotate smoothly; when the first clutch gear is driven to rotate by the motor and the set of gears, the first clutch gear compresses the clutch spring and moves away from the second clutch gear; the first clutch gear and the second clutch gear skid at the point of contact, thus releasing the driving force generated by the rotation of the motor.

4. An internal safety structure for toasters as in claim 1, wherein the driving gear bar is connected to the lifting rack securely.

5. An internal safety structure for toasters as in claim 1, wherein the lifting rack has a latch disposed in a position corresponding to the upper sensor and the lower sensor; when the lifting rack ascends to a horizontal position corresponding to that of the upper sensor, the latch contacts the upper sensor and the upper sensor immediately sends electrical signals to the circuit board; the preset programs of the integrated circuit of the circuit board control the motor to stop rotating; the lifting rack is then stopped from ascending continuously; when the lifting rack descends to a horizontal position corresponding to that of the lower sensor, the latch contacts the lower sensor and the lower sensor then immediately sends electrical signals to the circuit board; the preset programs of the integrated circuit of the circuit board control the motor to stop rotating; the lifting rack is then stopped from descending continuously.

6. An internal safety structure for toasters as in claim 1 or 4, wherein one side of the lifting rack connects to a holder placed inside the toaster slots and the other side is connected to the driving gear bar; the upward or downward movements of the driving

gear bar drive the lifting rack to move upwards or downwards accordingly; the lifting rack drives the slices of bread on the holder to move upwards or downwards accordingly.

7. An internal safety structure for toasters as in claim 1, wherein the integrated circuit of the circuit board contains custom software to preset timing for the programs; it automatically cuts off the power supply to the motor after the expiration of the preset time limit, so as to stop the motor from rotating continuously; the preset time limit is 5 to 30 seconds.

8. An internal safety structure for toasters as in claim 1, wherein the power supply of the heating wire uses a relay as a switch; the relay is electrically connected to the power source, the circuit board and the heating wire respectively, and is operated and controlled by the preset programs of the integrated circuit of the circuit board; upon completion of the preset programs, the power supply to the relay is automatically cut off and the relay immediately cuts off the power supply to the heating wire; when the descending procedure of the lifting rack functions improperly, the lower sensor does not send any electrical signal to the circuit board, and the circuit board does not supply power to the relay and so the relay does not switch on the heating wire.

9. An internal safety structure for toasters as in claim 1, wherein the circuit board contains a set of specially designed circuits which controls in a manner that when any fault, abnormality or overheating occurs in the timing or circuit programs of the circuit board, the circuit board sends instructions to cut off the power supply to the heating wire.

10. An internal safety structure for toasters as in claim 1 or 2, wherein the motor, the set of gears and the set of clutch gears are disposed inside a substantially enclosed

casing; the casing is placed on one side of the circuit board; the casing encloses the noise generated by the rotation of the motor, the set of gears and the set of clutch gears.